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A TEENAGER WITH EPILEPSY AND SEVERE VITAMIN D DEFICIENCY: WHO COULD HAVE PREVENTED THE PROBLEM?

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ABSTRACT

A 14 year old girl, MI, presented to the A&E with injuries sustained during a prolonged seizure. She was obese, suffered shortness of breath on exercise and had learning difficulties. Investigation demonstrated she suffered severe vitamin D deficiency, secondary hyperparathyroidism and hypocalcemia. The addition of Vitamin D supplementation to her treatment has resulted in significant improvement in her exercise tolerance and activity levels.

KEYWORDS

Epilepsy, vitamin D, Adolescence, Hand dynamometry

1. INTRODUCTION

Vitamin D deficiency is a growing problem in the UK with problems with severe deficiency in the winter months (1,2). In order to approach a public health problem of this magnitude it is valuable to use strategies to educate all about this issue, and in addition to identify and ensure treatment is given to those groups targeted as being at greatest risk. Historical and contemporaneous local work has shown that at risk groups include those with dark skin, those wearing traditional clothing, those with a high BMI, adolescents and those receiving treatments for epilepsy. This case history illustrates the presentation of a girl who could be included in all these at risk categories.

2. CASE HISTORY

A Somalian girl MI aged 14 years presented to the A&E with injuries after a prolonged seizure at home the previous night. She remembered taking a shower then waking up two hours later in her bed. Her mother did not call for an ambulance as she did not speak English. Following her seizure the patient suffered pain in her right knee, her right shoulder and a swollen tongue, bitten during her seizure. Her physical examination showed that she wore traditional clothing and had moderate obesity (BMI 30.5). There were no dysmorphic features, no neurocutaneous signs and no anemia. Her skin

was healthy but her teeth showed a number of caries and repaired dentition. A neurological examination showed widespread muscle weakness (hand dynamometry gave measurements of less than 10 kg on either hand). It was thought she suffered learning difficulties. It was found that she had presented to two other Hospital casualties with problems related to her seizures in the last month.

MI's tonic-clonic seizures began when she was 8 and living in Somalia. Her seizures were described as generalized tonic clonic involving all four limbs, with a post-ictal period lasting about 2 hours. She was prescribed Carbamazepine but compliance was prohibited due to a difficulty obtaining the medication. After she immigrated to the UK in 2005, her compliance improved and after September 2011, she was averaging two seizures per month. Her brain CT was normal but an EEG was abnormal with frequent episodes of slow and/or spike and slow wave complexes seen bilaterally or unilaterally in the mid-to posterior- quadrants. Her parents described that they were concerned about MI's school and home life. She could not read or write and spent all her spare time watching television at home. She had become unhappy and occasionally aggressive at home. More extensive biochemistry identified hypocalcemia (2.07 mmol/L (2.15-2.55), a raised alkaline phosphatase (732 IU/L (0-187), and reduced 25 (OH) D: 16.1 nmol/L (51-163).

MI was prescribed 6,000 units of Vit D daily for 6 months and is currently being given a trial of sodium valproate. At a 3 months review in clinic she was more active and attending school regularly. Her aggression had reduced. Her weight was a little lower at 78 kg and she had not suffered further seizures. Her calcium, liver functions and parathyroid hormone had returned to normal levels; the 25 (OH)D level was 52nmol/L. Measures of her hand dynamometry showed increased strength of between 15 and 20 kg in each hand.

3. DISCUSSION

The case demonstrated that groups of paediatric patients merit particular attention with respect to severe vitamin D deficiency. Local British and larger international studies show that an adolescent receiving treatment for seizures, particularly if overweight, dark-skinned or wearing traditional clothing is likely to be at particular risk of vitamin D deficiency (1,2). The patient in this case was not identified until she had presented twice to Hospital services with complications related to her seizures. By this point she suffered significant hyperparathyroidism and hypocalcemia, the symptoms of which complicated her underlying seizure disorder and learning difficulties. Publications have showed that adolescents themselves as well as tertiary neurologists may often be unaware of the potential risk to bone health in relation to a teenager's vitamin D status (3,4)

Those receiving anti-epileptics may have compromised bone health for a number of reasons. It has been proposed that anti-epileptic agents influence the metabolism of vitamin D through their enhancement of liver enzymes, reducing effective levels of the vitamin. There may also be other, direct mechanisms of anti-epileptics on bone that influence calcium metabolism (5). Such influences may have impact on muscle function, as in our case: this too has been observed with other antiepileptic agents (6, 7). The use of hand dynamometry may be particularly useful in teenagers to help assess their muscle power. The test has the advantage of demonstrating directly to them the benefits of treatment.

This case raises the issue of prevention as this was an avoidable complication and deterioration in our patient could have been prevented. One strategy would be to enhance the role of formularies, prescribing systems on computers or pharmacists (in hospitals or the community) to ensure that patients receiving anti-epileptic agents also receive a vitamin D supplement to prevent this easily treatable condition.

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