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Case Report

ARCHIVES OF CLINICAL AND MEDICAL CASE REPORTS

ISSN: 2575-9655

A Case Report of Anorexia Nervosa with Slimmer's Palsy in a 14-Year-Old Girl

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Abstract

We are outlining the case of 14 years old girl presented to regional eating disorder services for the assessment and management, following the GP (general practitioner) referral. She presented with significant and rapid weight loss of 23 kg over five months' time, due to food intake restriction, accompanied by a persistent pattern of behaviours to prevent weight restoration including excessive exercise regime, carbohydrates restriction and fluids overload. The vicious cycle of eating disorder and accompanied behaviours that resulted with significant weight loss led to development of physical complications of the eating disorder. She developed right sided peroneal neuropathy (Slimmer's palsy), which is a rare complication especially in child and adolescent population, that caused ankle movements restriction, inability to walk properly and compensatory high stepping gait. Along with peroneal neuropathy, she displayed number of physical and mental health symptoms related to the eating disorder. Although peroneal palsy has multifactorial aetiology, this case clearly demonstrates reversible cause due to mechanical damage of peroneal nerve in a context of weight loss, and shows how early recognition and management are crucial steps towards recovery and prevention of long-term impairment or disability.

Keywords: Anorexia Nervosa; Eating Disorders.

Background

Anorexia Nervosa is characterized by significantly low body weight for the individual's height, age and developmental stage, accompanied by a persistent pattern of behaviours to prevent restoration of normal weight such as restricted eating, purging behaviours and behaviours aimed at increasing energy expenditure (e.g., excessive exercise), typically associated with a fear of weight gain. Low body weight or shape is central to the person's self-evaluation or is inaccurately perceived to be normal or even excessive [1]. Peroneal neuropathy, or Slimmer's palsy, is often associated with excessive or rapid weight loss [2]. There are number of complications of anorexia nervosa, related to loss of adipose tissue that can potentially lead to foot drop. Although the mechanism of how weight loss causes the peroneal neuropathy is unclear, one hypothesis suggests, mechanical complications of rapid weight loss that can result in decreased adipose tissue around the fibular head, making the peroneal nerve vulnerable to damage by compression [3]. Most reported cases of slimmer's paralysis that were caused by mentioned adipose tissue loss, were after bariatric surgery, anorexia nervosa or intentional diet [3]. Nutritional aetiology plays important role, and specifically vitamins B12, B6, folate, and, most of all, B1 deficiency that might lead to the nervous system's energy metabolism failure[4]. However, aetiology of peroneal

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Citation: Ivona Kusen, Sara McDevitt, Jayenthrie Venketram, Rakesh Rampal, Jelena Vojnic Barisic. A Case Report of Anorexia Nervosa with Slimmer's Palsy in a 14-Year-Old Girl. Archives of Clinical and Medical Case Reports. 9 (2025): 157-160.

Received: July 25, 2025
Accepted: August 01, 2025
Published: August 08, 2025

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DOI:10.26502/acmcr.96550725

neuropathy is considered multifactorial [5], with inclusion of traumatic injuries that have unpredictable occurrence, and nervous system pathology [6] or toxins [4] that are rare causes in paediatric cases. Within this context, we will describe paediatric case anorexia nervosa complicated with right peroneal neuropathy.

Case presentation

14-year-old girl was assessed in regional community specialist eating disorder service following GP (General Practitioner) referral. She had no previous contacts with mental health services, nor history or weight loss or body shape concerns prior to the onset of eating disorder. Patient shared that she was diagnosed with anorexia nervosa and treated for the same. Eating disorder was preceded by alleged bullying that she has experienced in the past, and that was in relation to her weight.

She presented with significant and rapid weight loss of 23 kg over five months. Her weight loss was accompanied by a dysfunctional exercise regimen i.e. excessive exercising after each meal. She began restricting initially by reducing carbohydrates and subsequently reduced the volume of her intake and excessive ingestion of water i.e. 5-6 litres per day. This vicious cycle of events resulted in a rapid weight loss.

She had preoccupations around shape, weight and a distorted body image. She had a fear of weight gain and excessive feelings of guilt after every meal. Following the weight loss, she complained of tiredness, low energy levels, dizziness, feeling cold, light-headedness, and lack of concentration most of the time. She developed secondary amenorrhea.

She presented to the GP with weakness, tingling and numbness of the right foot. The patient had initially thought this was attributed to an old sport injury. She was managed conservatively and advised to rest. She however continued to exercise and to restrict her intake. With continued restriction and exercise this progressed to inability to walk properly.

She then represented to the GP (general practitioner) with an inability to move the right foot, and she was referred to the local hospital where she was diagnosed with foot drop. She was reviewed by physiotherapist who had subsequently prescribed ankle-foot orthosis. She was prioritized for assessment in Child and Adolescent Regional Eating Disorder Service (CAREDS). On initial assessment, a detailed history revealed rapid weight loss, dysfunctional exercise which resulted in a foot drop. Prior to the onset of the restricted eating pattern, the patients' weight was 77.3 kg and a median body mass index (mBMI) of 125.79%. Six months after the dietary restriction and dysfunctional exercise, her weight dropped to 54 kg with mBMI of 92.83%. Physical examination including the MEED risk assessment has been completed. She had orthostatic hypotension observed upon transitioning from a seated to a standing position, with postural blood pressure drop of 20 mmHg, accompanied by an increase in heart rate of 30 beats per minute. ECG has shown no abnormalities.

Neurological Examination of the right ankle: Her foot was cold and blue with decreased perfusion. The capillary refill time (CRT) was 5 seconds. The tone was reduced at the right ankle. The reflexes were not present at the right ankle. There was decreased sensation to pain, soft touch, hot and cold perception. The power assessment was conducted using a scale of parameter that scored out of 5. The dorsiflexion of the ankle was reduced and measured 1/5, Ankle inversion was reduced and measured approximately 1-2/5 and ankle eversion was reduced and measured approximately 1-2/5. There were normal superficial reflexes, no bowel or bladder abnormalities. Gait analysis identified a high stepping gait and did not display the ability to dorsiflexion the foot. There were no abnormalities observed on the left limb.

The rest of the neurological examination was within normal limits.

Follow-up Neurological assessment after 2 months had demonstrated full recovery of the motor, power and tone of the ankle. Her gait had improved and was able to dorsiflexion the foot.

Investigations

Investigations revealed leukopenia of 3.98 and neutropenia of 1.31. Nerve conduction study identified electrophysiological evidence for a mild recovering deep peroneal neuropathy localisable to the fibular neck. Compound muscle action potentials (CMAPs) for right peroneal nerve were absent with normal responses on the left. CMAPs for right deep peroneal nerve demonstrated conduction block with reduced velocity and normal responses on the left. CMAPs for right tibial nerve were normal.

Imaging studies including CT and MRI scans of the brain and spine were normal. All other blood tests, including urea and electrolytes, liver function tests, thyroid function tests, alpha-fetoprotein, C-Reactive Protein, Creatine kinase, lactate dehydrogenase, prolactin levels, glucose, vitamin B12, folate, serum ferritin, HbA1c, vitamin D levels, bone profile, and lipid profile were within normal ranges. No significant abnormalities were detected on her electrocardiogram (ECG).

Management

Psychosocial treatment involved Psychoeducation, Family based treatment (FBT) [7] on a weekly basis and regular psychiatric reviews. Her family engaged well in FBT in family therapy. Nutritionally, Patient was already taking vitamin B and D, Calcium and Iron supplement prescribed by the GP. She was commenced on a meal plan for weight

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restoration that included three meals and 3 snacks. Initially she was started on a two-week weight restoration meal plan (1500kcal), followed by a Weight Restoration meal plan (2500 kcal). As the patient was not able to tolerate 3 snacks initially, these were replaced with Fortisip 125 mls three times a day instead. The patient was followed up weekly for mental state and physical health monitoring based on the MEED Guidelines (8). She became fully compliant with the meal plan, progressing toward a healthy weight.

She was referred to physiotherapy where no evidence of injury was found. Physiotherapy treatment included an exercise regime to avoid muscle atrophy and achieve rehabilitation (range-of-motion and passive strengthening exercise). List of exercises included seated toe raise, isometric toe flexion, active toe extension and AROM ankle dorsiflexion, as per physiotherapist lower limb passive exercise programme sheet. She was also prescribed an ankle-foot orthosis.

Outcome and follow up

Within one week of introducing the meal plan, the patient's weight began to increase. In two months follow up she gained 5 kg, with MBMI change from 92.83% to 99.42 %. Following the re-nourishment process, her blood pressure and heart rate normalized within two weeks. Her menstrual periods returned during the 6th week of treatment. Right foot drop had fully recovered after two months of nutritional and physical rehabilitation. She achieved weight of 60.2 kg and % mBMI of 96.07 %. Her family engaged in Family Therapy Anorexia Nervosa (FT-An). She became fully compliant with the meal plan, progressing toward a healthy weight. Her fear of weight gain diminished, and she was more confident with her self-image. There was no residual anxiety around the meals, and she was able to enjoy social eating with her family and friends.

Discussion

Our case report identified right peroneal food drop secondary to rapid weight loss of 23 kg over 6 months' time. This girl lost 30.1 % of her initial weight. This case clearly demonstrates reversible cause of foot drop. Our case has shown how rapid weight loss and nutritional deficiency, in context of anorexia nervosa, can lead to development of mechanical damage of the peroneal nerve due to loss of adipose tissue around fibular neck, and its vulnerability to compression injury with consequential foot drop. Approximately 20% of peroneal mononeuropathies are developed after dieting and weight loss [9]. One of case reports highlighted the significance of an exertional lower limb pathology [9], which might also be a case with our patient.

In most cases, peroneal neuropathy caused by weight loss generally has a good prognosis after conservative management [9]. In other words, with the combination of physiotherapy and rehabilitation along with nutritional support for weight gain, recovery rates were high in most reported cases, including ours [9]. In addition to nutritional rehabilitation, one systematic review has shown that prompt treatment with a vitamin B complex minimizes the risk of irreversible motor or sensory-motor deficit, with a requirement for further investigations needed to evaluate dosage and duration of Vitamin B complex supplementation [4]. Although there are multiple medical complications associated with eating disorders, in particular anorexia nervosa, most of them can be effectively treated with nutritional management, weight normalization and the termination of restrictive and compensatory behaviours. For that reason, early recognition, assessment and management are imperative in recovery process with highlight on physical health monitoring along with nutritional rehabilitation [10, 11].

It is important to consider alleged bullying as a trigger for anorexia nervosa in our case. Bullying is one of public health issues due to its high prevalence and the negative consequences that it has on academic performance and the psychosocial development of children and adolescents [12].

Learning Points/Take Home Messages

- Early recognition and treatment of medical complications of eating disorders, is crucial for recovery
- Peroneal neuropathy is a rare complication of eating disorders especially in children and adolescents.
- Early physiotherapy and physical rehabilitation are important to reduce long term impairment or disability associated with foot drop.
- Nutritional rehabilitation and regular medical monitoring are essential to prevent significant morbidity and complications of anorexia nervosa.

Data Availability

Data used to support the findings of this study are included within the article.

Additional Points

Adapted from patient: to be added

Ethical Approval

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committee on human experimentation with the Helsinki Declaration of 1975, as revised in 2008. The authors assert that ethical approval for publication of this case report was not required by their local ethics committee.

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DOI:10.26502/acmcr.96550725

Disclosure

This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Conflicts of Interest

Authors Dr Ivona Kusen, Dr Sara McDevitt, Dr Jayenthrie Venketramen, Dr Jelena Vojnic Barisic, and Dr Rakesh Rampal, do not have any conflicts of interest to report.

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