

Case Reports

The confounding effect of the development of idiopathic orthostatic edema and thyrotoxicosis on weight fluctuation related to effects on free water clearance in a woman with long-standing surgically induced panhypopituitarism and diabetes insipidus

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Summary

Purpose: To evaluate the effect of idiopathic orthostatic edema and the effect of thyrotoxicosis on weight fluctuation and fluid retention in the presence of surgically induced panhypopituitarism and diabetes insipidus controlled with hormone replacement. **Materials and Methods:** Dextroamphetamine sulfate was used for weight gain when no other etiologic factor was found. Methimazole was used when weight loss occurred when serum T4 and free T4 indicated thyrotoxicosis. **Results:** Sympathomimetic amine therapy very effectively controlled the weight gain and methimazole controlled the weight loss. **Conclusions:** Hypopituitarism and diabetes insipidus controlled with hormone replacement do not protect against fluid retention from idiopathic edema.

Key words: Sympathetic hypofunction; Diabetes insipidus; Thyrotoxicosis; Panhypopituitarism; Weight loss.

Introduction

There are certain endocrine disorders that are associated with weight gain, related to an inability to adequately clear free water. Though the condition known in the past as idiopathic orthostatic edema is associated with secondary hyperaldosteronism, the main mechanism for edema and subsequent weight gain is the increased capillary permeability associated with the increase in hydrostatic pressure associated with standing [1]. The increase in capillary permeability seems to be related to hypofunction of the sympathetic nervous system, as evidenced by significant improvement in edema and weight loss following the treatment with the sympathomimetic amine dextroamphetamine sulfate [2]. Evidence that the secondary hyperaldosterone plays only a minor role was shown in the same study by finding only a mild decrease in weight with spironolactone over a six-month period and yet these patients had a much more profound effect during the second six months with dextroamphetamine sulfate [2].

Thyroid hormone is a sympathomimetic amine. Weight gain and fluid retention are also believed to be related to increased capillary permeability when hypothyroidism is present, and weight loss by the use of thyroid hormone to improve weight gain has a similar mechanism to dextroamphetamine sulfate for idiopathic orthostatic edema, i.e., correcting the capillary permeability defect. Because hypofunction of the sympathetic nervous system and the resulting increase cellular permeability leads to many other pathological states, especially pain syndromes and muscle fatigue and motility defects, the condition has been renamed the sympathetic neural hyperalgesia edema syndrome [3].

The case presented here describes weight and fluid changes in a woman with secondary hypothyroidism with appropriate thyroid hormone replacement and diabetes insipidus adequately controlled with DD arginine vasopressin (DDAVP) when she developed idiopathic orthostatic edema followed subsequently with thyrotoxicosis related to Grave's disease.

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Case Report

A 14-year-old girl who was slowly losing vision bilaterally was diagnosed with an optic glioma and underwent craniotomy and six weeks of radiation treatment. Her pituitary gland was injured, whether by the tumor or subsequent treatment. At that time, it was noted that her cortisol level was low to normal. She presented to us soon after for primary amenorrhea. She was diagnosed with hypogonadotropic hypogonadism and started on conjugated estrogen and medroxyprogesterone acetate, which brought on normal periods.

At age 27, she underwent a diagnostic laparoscopy which revealed a blockage in one fallopian tube. At this time, her weight was stable at 49 kg. The following year, she gained two kg over a few months despite dieting and exercising three times a week. She was started on hydrocortisone ten mg BID for persistently low cortisol and synthroid 0.05 mg daily. Over the next one to two years, she continued to gain weight, reaching 76 kg maximum. Now, at age 29, she was diagnosed with idiopathic edema and started on dextroamphetamine sulfate. She lost the first 3.6 kg over four months. She was also diagnosed with diabetes insipidus, which could usually be controlled with fluid restriction, although she used DDAVP when necessary.

Two years later, at age 32, she started IVF after completing 12 cycles of human menopausal gonadotropins, which had only resulted in one ectopic pregnancy in her only patent tube. After some failed cycles and two miscarriages, she delivered a child at age 35. She had stopped all medications during the pregnancy and expected significant weight gain, but only gained 15 kg before delivery. She was back down to her normal weight three weeks later. Within two weeks, however, she started to retain fluid again. She restarted DDAVP and dextroamphetamine sulfate ten mg BID. She continued with these medications plus prednisone, in lieu of hydrocortisone, L-thyroxine, and estrogen/progesterone replacement. She continued regular follow-ups and had small fluctuations in weight, with the most significant weight gain in her late 40s.

At the age of 55, she had an acute exacerbation of the idiopathic edema, suddenly gaining eight kg over one week, with extreme fluid retention in the legs and feet. Her weight at this time was close to 68 kg. Increasing dextroamphetamine sulfate from ten mg BID to 15 mg BID, she lost most of the weight over the next two months. The medication was subsequently decreased to 15 mg daily.

Less than a year later, she began losing a significant amount of weight. She went down to 46 kg. It was thought that she might be in a remission with the idiopathic edema. Decreasing the dextroamphetamine sulfate to ten mg daily had no effect, so additional thyroid studies were sought. Serum thyroxine (T4) and free T4 were

both high, and thyroid stimulating immunoglobulins were also high. Thyroid imaging with uptake revealed a normal-sized thyroid with increased two- and 24-hour thyroid uptakes, consistent with Grave's disease. Methimazole was started at this time.

Currently, her TSH and T4 are checked every three weeks and thyroid medications adjusted as needed. She continues prednisone 7.5 mg daily, DDAVP, and dextroamphetamine sulfate ten mg daily. She is at her normal weight with minimal fluid retention.

Discussion

In this woman's case her diabetes insipidus was caused by the absence of the posterior pituitary hormone vasopressin. The symptoms are polyuria and polydipsia untreated but she was reasonably well-controlled with DDAVP with her being able to sleep most of the night without drinking. This study shows that correcting diabetes insipidus does not protect against the development of severe edema and weight gain from the sympathetic neural hyperalgesia edema (idiopathic orthostatic edema) syndrome. The marked weight loss in a short time with thyrotoxicosis shows that the weight loss is possibility also related to loss of fluid. It is not clear if the quick marked weight loss in a short time may have been related to the concomitant presence of diabetes insipidus.

References

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