

# The relationship between hyperphagia and increased intracranial pressure: A new look at obesity treatment

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## Abstract

Some diseases that progress with excessive intracranial pressure, such as pseudotumor cerebri, are associated with obesity. A 64-year-old female who was admitted to the hospital with a complaint of weight gain was diagnosed with pseudotumor cerebri. She had had a lumboperitoneal shunt for 10 years, and it had stopped working. It was challenging to determine whether the shunt tip, observed between abdominal fat layers and obscured by pseudomembranes, had become functionally shortened due to the patient's weight gain and had failed to reach the peritoneal cavity, or whether long-standing pseudomembrane obstruction had impaired drainage of cerebrospinal fluid. The latter situation may have led to increased intracranial pressure, subsequently triggering hyperphagia and contributing to the patient's further weight gain. Based on this clinical example, demonstrating that excessive intracranial pressure is associated with hyperphagia may inform novel approaches to obesity management.

**Keywords:** hyperphagia, mastication, intracranial pressure, obesity

## Introduction

The rising prevalence of obesity necessitates research to clarify its etiopathogenesis and guide effective treatment strategies. Cerebrospinal fluid flow and intracranial pressure disorders have been shown to affect the prevalence of headache and visual functions. However, the relationship of these disorders with obesity, which affects metabolic and hormonal factors, has also been noted in recent studies [1]. Some investigations have focused on using the mechanical functions of mastication in the rehabilitation and treatment of cranial pain and some postoperative comorbidities [2]. However, individuals with certain diseases that are accompanied by increased intracranial pressure, such as idiopathic intracranial hypertension and pseudotumor cerebri, are generally overweight or obese [3]. Treatment typically involves weight management in conjunction with medical and surgical interventions aimed at reducing intracranial pressure [1, 3].

Based on the mechanical-functional connection of headache and mastication and diseases in which headache is associated with obesity for endocrine-metabolic reasons, a connection between headache-mastication-hyperphagia and being overweight or even obese has been proposed [3]. This situation is contrary to the classical view that the benefits of weight control can be used to manage headache; treatment for headache is promising for a permanent solution to the management of obesity.

Here, we focus on a 64-year-old female who presented with weight gain and gastrointestinal system symptoms. She was diagnosed with pseudotumor cerebri and had had a lumboperitoneal (LP) shunt for 10 years. We determined that the shunt remained in the subcutaneous tissue and resulted in the dysfunction.

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The authors stated that the written consent was obtained from the patient presented with images in the study.

### Conflict of Interest

No conflict of interest was declared by the authors.

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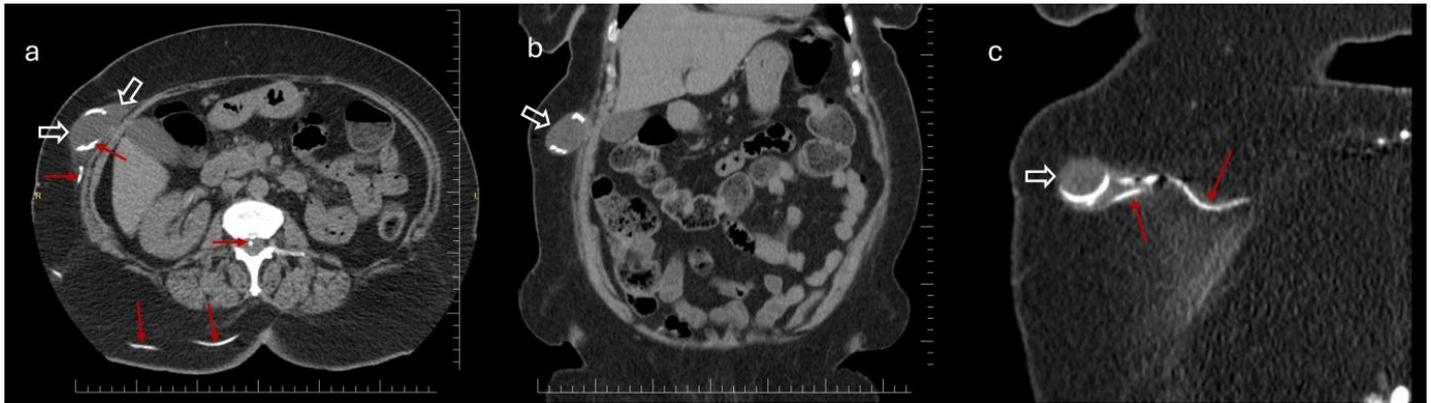
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**Figure 1.** Unenhanced abdominal computed tomography. a) axial section, b) coronal section, c) sagittal section. Shunt dysfunction due to the shunt tube migrating to a subcutaneous location in the abdomen. Cystic lesion in the subcutaneous tissue (open arrow). Lumboperitoneal shunt tube (red arrow).



## Case presentation

The patient's medical history included hypertension, cardiac arrhythmia, papilledema, pseudotumor cerebri, and an LP shunt inserted 10 years ago. She also stated that she had had a pacemaker inserted 3 years ago. She had been examined for hyperglycemic symptoms for a few months, and had experienced increasing episodes of headaches and increasing gastrointestinal system symptoms for the last few years. Her primary complaints were dyspeptic complaints, indigestion-constipation, and weight gain.

Although no other intraabdominal abnormality was detected upon ultrasonography, the distal end of the LP shunt was subcutaneously terminated. We observed a cystic formation measuring 6 cm in diameter at its tip. In abdominal computerized tomography (CT), the density of the linear catheter entering the spinal canal at the level of the L2 vertebra and a cyst approximately 6 cm in diameter around the catheter in the subcutaneous tissue in the right subcostal area were noted. The catheter did not have an intraperitoneal extension (Figure 1). In the brain CT, the 3rd ventricle, lateral ventricle, and hemispheric cortical sulci were slightly widened secondary to atrophy.

Although the patient's rate of weight gain could not be determined due to the limitations of the anamnesis, the patient's Body Mass Index was 32. The increase in the prevalence of gastrointestinal symptoms and the emergence of hyperglycemia, along with her weight gain, the presence of cardiac disease, and the accompanying headache and shunt dysfunction, all suggested that the patient might be suffering from intracranial pressure-related issues. Therefore, the patient was referred to a center specializing in gastrointestinal conditions with recommendations to receive treatment to reduce her intracranial pressure and address her dysfunctional shunt.

## Discussion

Some diseases that progress with excessive intracranial pressure, such as pseudotumor cerebri, are associated with obesity [4, 5]. Weight loss has been shown to support the management of conditions such as idiopathic intracranial hypertension [3]. Moreover, genetic disorders such Prader-Willi syndrome have been linked to hyperphagia. Recent studies have proposed therapeutic approaches targeting neuropsychiatric and endocrinological factors in obesity management [6].

This case study suggests that elevated intracranial pressure may affect eating behavior, mastication function, and

headache perception, potentially contributing to weight gain [7]. Demonstrating a link between excess intracranial pressure and hyperphagia can pave the way for new developments to improve, or perhaps even change, the obesity treatment spectrum.

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