

## Patulous eustachian tube complicating gastric bypass surgery

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### Abstract

**Objective:** We report the first case in the English literature of a patulous eustachian tube occurring after laparoscopic Roux-en-Y gastric bypass surgery for obesity.

**Method:** Case report of a 44-year-old woman who was referred to our ENT clinic complaining of autophonia and bilateral aural fullness. The patient had noticed these symptoms after she had undergone a laparoscopic Roux-en-Y gastric bypass surgery to aid weight loss.

**Result:** On the basis of the medical history, clinical examination and immittance measurement (revealing a change in acoustic immittance synchronous with normal breathing in the right ear), a diagnosis of patulous eustachian tube was made, more severe in the right ear than the left.

**Conclusion:** We report a case of patulous eustachian tube occurring after laparoscopic gastric bypass surgery for weight loss, which could be considered as one of the possible complications of this surgery. Our patient began to notice the symptoms of patulous eustachian tube after a 20 kg weight loss.

**Key words:** Eustachian Tube; Gastric Bypass; Weight Loss; Autophonia; Audiometry; Impedance

### Introduction

Loss of body weight is a common aetiological factor associated with patulous eustachian tube,<sup>1,2</sup> explained by loss of tissue volume (i.e. Ostmann's fatty tissue and glandular tissue) within the tubal valve in the cartilaginous portion.<sup>3,4</sup> Correlations with other factors have also been reported, including pregnancy, oral contraceptive use, allergies and long-term survival with nasopharyngeal carcinoma (post-irradiation).<sup>4</sup>

Patients with patulous eustachian tube may remain asymptomatic or may report symptoms ranging from the mild to the severe, such as autophony, aural fullness or hearing their own breathing. Autophony is usually the most annoying symptom.<sup>5</sup>

The diagnosis can be confirmed by visualising medial and lateral movement of the tympanic membranes coincident with regular or forced nasal breathing.<sup>3</sup> This finding is best observed with an examination microscope or with video-otoscopy, in the seated patient reporting active autophony during examination. In patients with severe patulous eustachian tube, nasopharyngoscopic examination may reveal a wide lumen near the pharyngeal orifice of the eustachian tube.<sup>6</sup>

Impedance audiometry, especially while symptoms are active, may successfully diagnose patulous eustachian tube by documenting tympanic membrane movement as changes in acoustic immittance with breathing.<sup>7</sup> Tympanometry may also show hypermobility of the tympanic membranes.<sup>8</sup> Sonotubometry (a eustachian tube ventilatory function test) has also been used for the diagnosis of patulous eustachian tube.<sup>5</sup> Yoshida *et al.*<sup>9</sup> and Kikuchi *et al.*<sup>6</sup> diagnosed patulous eustachian tube with computed

tomography (CT), using the multiplanar reconstruction technique.

Numerous medical and surgical treatments for patulous eustachian tube have been reported.<sup>3</sup>

We report the first case in the English literature of patulous eustachian tube developing during the first post-operative year in a patient who had undergone laparoscopic Roux-en-Y gastric bypass surgery for obesity (undertaken as previously described).<sup>10</sup>

### Case report

A 44-year-old woman was referred to our otolaryngology and head and neck surgery clinic complaining of autophonia and bilateral aural fullness, especially in the right ear. She had noticed these symptoms after undergoing a laparoscopic Roux-en-Y gastric bypass procedure to aid weight loss. Pre-operatively, the patient's height and weight had been 174 cm and 130 kg, respectively, giving a body mass index (BMI) of 43, equating to obesity. At approximately three months post-operatively, when the patient had lost about 20 kg (i.e. a reduction in body weight of 15.3 per cent, equating to a BMI of 36), she had begun to notice symptoms of patulous eustachian tube. These symptoms had become more severe with additional weight loss. At one year post-operatively, the patient's body weight had been quite stable, at approximately 80 kg (equating to a BMI of 26). At this stage, the symptoms had presented daily, being absent or less severe in the early morning and more pronounced in the afternoon.

The patient's aural fullness had become more disturbing when she swallowed and when she drove her car along a

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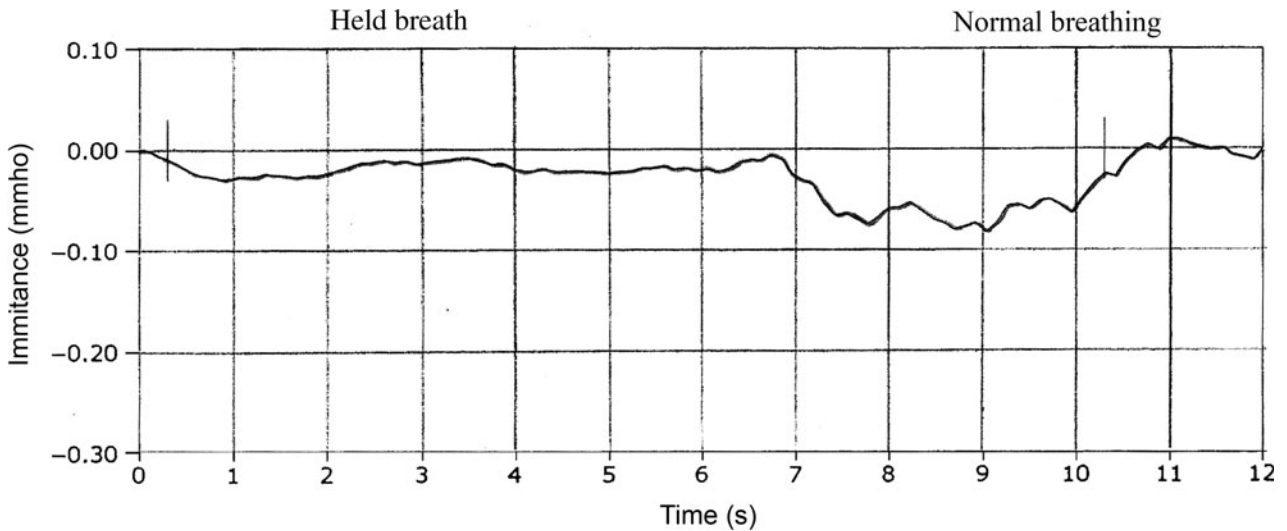


FIG. 1

Immittance audiometry of the right ear, showing changes in acoustic immittance synchronous with normal breathing.

downhill slope. The symptoms had diminished or disappeared in the supine position. There had been no other aural symptoms or history of ear disease. The patient had asthma and had been taking medications as necessary during the pre- and post-operative periods.

Examination of the seated patient's ears, using an examination microscope, revealed normal tympanic membranes and no evidence of middle-ear effusion. Medial and lateral movement of the tympanic membranes with breathing could not be clearly visualised; however, when the patient was asked to perform the Valsalva manoeuvre there was a very clear movement of the tympanic membranes in and out (compared with the normal tympanic membranes of a healthy colleague also asked to perform the Valsalva manoeuvre). At this time, the patient's symptoms became more severe. Placing the patient's head down in a dependent position between her legs, performing ipsilateral internal jugular vein compression, and having her lie

down for few minutes, provided temporary relief from the symptoms.

Examination of the nasopharynx with a flexible fibre-optic endoscope revealed no abnormality.

Pure tone audiometry was performed, which showed bilateral, symmetrical, normal to mildly decreased pure tone thresholds. There was no evidence of conductive hearing loss. Immittance audiometry was performed using a GN otometrics instrument (GN, Taastrup, Denmark). Type A tympanograms were recorded bilaterally. Immittance measurement for 12 seconds revealed fluctuations in the right ear baseline trace. There was a change in acoustic immittance synchronous with normal breathing, and no change during cessation of breathing, denoting movement of the tympanic membrane with breathing (Figure 1). In the left ear, there was no significant change in acoustic immittance during normal breathing, compared with recordings during cessation of breathing (Figure 2).

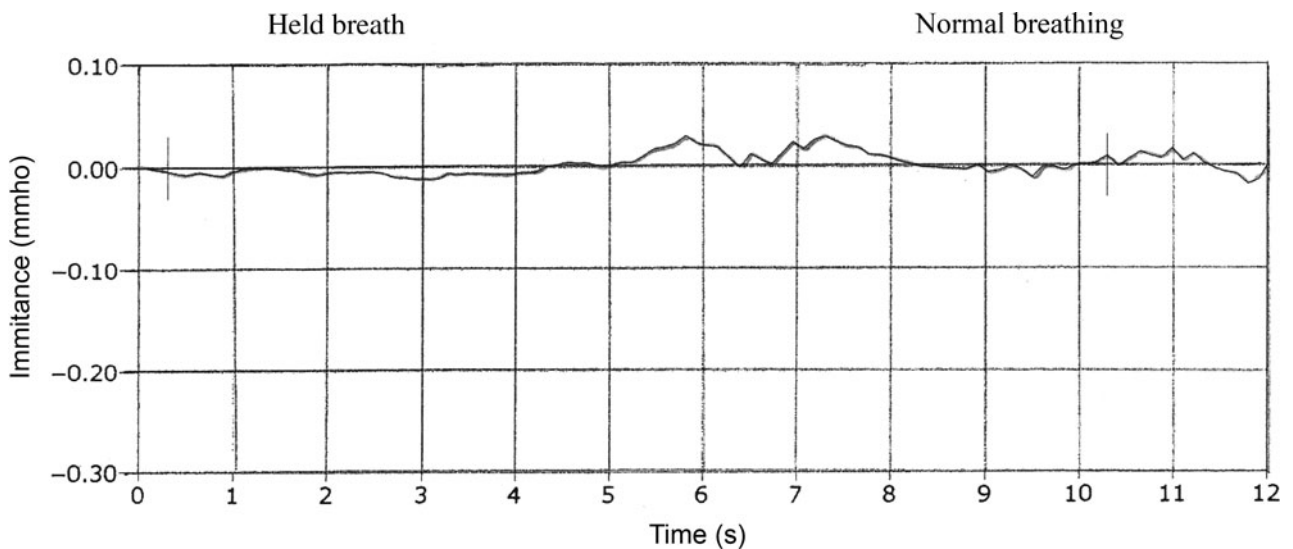


FIG. 2

Immittance audiometry of the left ear, showing no change in acoustic immittance during normal and held breathing.

On the basis of the patient's medical history, clinical examination and immittance measurements, a diagnosis of patulous eustachian tube was made, more severe in the right ear than the left.

The condition was explained to the patient and she was reassured. She was instructed to avoid unnecessary decongestants or nasal steroid sprays. She was also informed that placing her head between her legs or lying supine for a few minutes would provide temporary relief of symptoms. Myringotomy with a ventilation tube was suggested for the right ear, but the patient was not interested in pursuing this. At a follow-up visit after four weeks, the patient related that she had started to become accustomed to her condition.

### Discussion

Patulous eustachian tube has been regarded as a relatively rare condition. This condition should be suspected when a patient complains of autophony. Aural fullness is another symptom of the condition. Patulous eustachian tube is often confused with eustachian tube obstruction and negative middle-ear pressure; however, taking decongestants may worsen the condition. The clinical symptom of autophony which eases when the patient lies down provides a strong diagnostic clue. Lateral and medial movement of the tympanic membranes synchronous with breathing is a characteristic finding of patulous eustachian tube. The otological literature reports autophonia as a common symptom of patulous eustachian tube associated with weight loss; however, the condition may occur as a sequel to various other conditions.

- **Loss of body weight is a common aetiological factor for patulous eustachian tube**
- **The diagnosis is best confirmed by impedance audiometry**
- **Patulous eustachian tube could be considered as one of the possible complications of laparoscopic gastric bypass surgery for obesity**

The diagnosis is best confirmed by impedance audiometry – an easy, inexpensive and non-invasive investigation. Other reported investigations include sonotubometry and CT. Confirmation of a diagnosis of severe patulous eustachian tube is essential, especially when surgical treatment is considered.

We report a case of patulous eustachian tube which developed after laparoscopic gastric bypass surgery for obesity. Patulous eustachian tube could be considered as one of the possible complications of such surgery. Karwautz *et al.* reported a case of patulous eustachian tube in a patient with adolescent anorexia nervosa.<sup>2</sup> In this case, symptoms presented after a weight loss from 54 to 40 kg (i.e. a weight loss of 14 kg), equal to a 26 per cent reduction

of body weight. Our patient started to have symptoms of patulous eustachian tube after a weight loss from 130 to 110 kg (i.e. a 20 kg weight loss), equal to a 15 per cent reduction of body weight. This raises the question of how severe an absolute or relative weight loss must be in order to cause symptoms of patulous eustachian tube.

In the future, it would be of interest to study the occurrence of patulous eustachian tube in patients experiencing rapid weight loss following laparoscopic, bariatric surgery for obesity.

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