CASE REPORT

Combined surgical treatment for severe sleep apnoea, to improve BiPAP compliance

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SUMMARY

Positive airway pressure (PAP) devices are used in the treatment of obstructive sleep apnoea syndrome (OSAS). In cases of PAP failure, many different surgical methods can be used for the treatment. The authors present an unusual case of a patient with Bi-level PAP (BiPAP)-intolerant severe OSAS who was treated with combined surgical methods. A 55-year-old man was treated with BiPAP due to OSAS; he was admitted to the clinic with nose stuffiness, respiratory distress and BiPAP adherence with tolerance and compliance problems. Septal deviation, concha hypertrophy, lateral pharyngeal band hypertrophy and Thornwaldt cyst were determined in the examination. Combined surgical methods were administered. The patient's apnoea hypopnoea index (AHI) was 72.8 in diagnostic polysomnography. Preoperative AHI was 7.3 and postoperative AHI was 2.3 while using BiPAP and, after the surgery, the BiPAP intolerance was eliminated. The authors suggest that a combination of different surgical methods would be an adjuvant treatment to increase BiPAP compliance.

BACKGROUND

Obstructive sleep apnoea syndrome (OSAS) is a common disease affecting 2–4% of adults.¹ It has many symptoms such as snoring, daytime sleepiness, nocturia, fatigue, headache, concentration impairment, sexual dysfunction and palpitation. When the apnoea hypopnoea index (AHI) is greater than 15, cardiocerebrovascular risk increases.¹ OSAS is a chronic disease that requires a multidisciplinary approach.

Positive airway pressure (PAP) is a single consensus treatment for mild, moderate and severe OSAS. BiPAP treatment is administered in cases of continuous positive airway pressure (CPAP) failure.² We aimed to present a case of a patient who underwent septoplasty, inferior turbinate submucous resection, microdebrider-assisted transnasal endoscopic cyst marsupialisation and expansion sphincter pharyngoplasty (ESP), simultaneously; these were combined due to BiPAP intolerance. We include a review of the related literature.

CASE PRESENTATION

A morbidly obese 55-year-old man who was treated with BiPAP for 6 months due to severe OSAS, presented to the outpatient clinic with BiPAP adherence with tolerance and compliance problems; he had nose stuffiness and was in respiratory distress. Examination revealed a deviated nasal septum and grade 1 sized tonsils; the patient's Mallampati assessment was class 4.

In the endoscopic examination, the inferior turbinate tails were hypertrophic bilaterally, lateral pharyngeal band hypertrophy was present and there was a nasopharynx midline mass covered by smooth mucosa. During the Müller's manoeuvre, complete circular velopharyngeal closure and moderate base of tongue collapse were observed.

In the nasopharyngeal MRI, a 25×20 mm Thornwaldt cyst was determined (figure 1). Diagnostic punch biopsy was performed. In the histopathological examination of the biopsy specimen, lymphoid tissue and blood vessels under the respiratory epithelium were determined and the cyst was benign.

TREATMENT

Septoplasty, inferior turbinate submucous resection, microdebrider-assisted transnasal endoscopic cyst marsupialisation and ESP were carried out.

OUTCOME AND FOLLOW-UP

The patient's AHI was 72.8 in the diagnostic polysomnography. The AHI was 7.3 preoperatively and 2.3 postoperatively while using BiPAP. Preoperative inspiratory airway pressure (IPAP) level was 21 mbar and IPAP was decreased to 15 mbar postoperatively. Preoperative expiratory airway pressure (EPAP) level was 17 mbar and EPAP was decreased to 10 mbar postoperatively. We observed that there were 6 mbar decreases in inspiratory pressure and 7 mbar decreases in expiratory pressure after the surgery. There was no significant change in sleep efficiency (table 1). The patient could not have used BiPAP even 1 h preoperatively, but he could use it 6 h every night postoperatively. The patient

Figure 1 Sagittal T1-weighted MRI showing a Thornwaldt cyst of the nasopharynx.

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Table 1 Sleep efficiency, AHI, IPAP and EPAP change status

	Preoperative	Postoperative
Sleep efficiency	81.1%	78.1%
AHI*	7.3	2.3
IPAP	21	15
EPAP	17	10

*AHI levels at the end of titration.

AHI, apnoea hypopnoea index; IPAP, inspiratory airway pressure; EPAP, expiratory airway pressure.

was seen in follow-up. In assessments at the first and third months after titration, the patient used the BiPAP device regularly. After the surgery, the BiPAP intolerance was eliminated.

DISCUSSION

OSAS can be treated with oral tools, surgery and PAP devices. Although PAP devices provide efficient treatment in OSAS, PAP intolerance is a significant factor that affects the success of the treatment. It is known that high PAP pressure and nasal obstruction decreases CPAP adherence and compliance.³ Ten percent of the patients being treated with CPAP stop using it in the first months of therapy and 30% stop using CPAP at the end of 5 years.⁴ BiPAP is used in patients who have CPAP intolerance so as to increase patient-ventilator compatibility.^{2,5}

Oral tools, multilevel surgeries, hypoglossal nerve stimulation, maxillomandibular advancement surgery and tracheotomy are alternative methods to PAP devices for sleep apnoea treatment.⁶ These methods can either be used separately or in combination. Maxillomandibular advancement surgery, modified genioplasty and cervicomentary liposuction were administered to an obese patient with CPAP intolerance, and a combination of different surgeries was advised.⁷ In our case, endoscopic nasopharyngeal surgery, nasal surgery and oropharyngeal surgery were combined, and performed simultaneously.

There are many studies offering differing opinions about the role of nasal pathology and nasal surgery in OSAS treatment.^{8,9} The CPAP titration level decreases 2 cm H₂O after nasal surgery.¹⁰ In our case, the postoperative BiPAP titration level decrease cannot be explained by the nasal surgery alone, because the decrease was more than 2 cm H₂O. We believe that the contribution of combined surgery provided this decrease.

Thornwaldt cysts are rare benign congenital cysts.¹¹ They are mostly asymptomatic. When they grow, they cause mechanical obstruction and become symptomatic. It is known that cold and dry air increases inflammatory mediators in the nose and CPAP can start early nasal inflammation.^{12,13} In our case, while there was no nasal congestion before BiPAP treatment, nasal congestion developed in the early period after the treatment. This can be explained by nasal mucosal inflammation due to BiPAP treatment. Additionally, the cyst may have grown with the inflammation and become symptomatic. Microdebrider-assisted transnasal endoscopic Thornwaldt cyst marsupialisation is a safe method in the long term.¹⁴ We preferred to use this method in our case.

ESP is a new technique used for sleep apnoea treatment.¹⁵ This technique produces successful outcomes in patients with OSAS who have grade 1–2 tonsils and lateral pharyngeal wall collapse; it can be used in the treatment of PAP intolerance or PAP failure.¹⁵ In ESP technique, the mucosa and muscles of the uvula and soft palate are protected differently from classical uvulopalatopharyngoplasty and, because of this, the ESP technique does not affect the PAP treatment negatively. In our case,

ESP was used as a part of a combined treatment so as to decrease the high BiPAP pressure. Postoperation IPAP and EPAP levels decreased and BiPAP intolerance was eliminated. The patient continued using BiPAP in the postoperative first year. In conclusion, we believe that surgical treatment can be an option in patients with severe apnoea, to increase BiPAP adherence and compliance; surgical treatment has an important role in decreasing BiPAP intolerance.

Learning points

- ▶ Thornwaldt cysts may cause Bi-level PAP (BiPAP) intolerance, and endoscopic examination of sleep apnoea patients is important for the differential diagnosis.
- ▶ Expansion sphincter pharyngoplasty may be used as a part of a combined treatment so as to decrease the high BiPAP pressure.
- ▶ Combined surgical treatment has an important role in treating BiPAP intolerance.

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Competing interests None declared.

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