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ORIGINAL ARTICLE

# Study of gastro-esophageal reflux disease among obstructive sleep apnea patients



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## KEYWORDS

OSAS;  
GERD;  
CPAP

**Abstract** *Background:* Gastro-esophageal reflux disease and obstructive sleep apnea syndrome are often co-morbid disorders. Frequency of GERD among OSAS patients and its response to CPAP treatment need to be clarified.

*Objectives:* To determine the prevalence of GERD among OSAS patients and to assess its response to CPAP treatment.

*Methods:* 30 patients were diagnosed as having OSAS and 15 healthy subjects selected as the controlled group underwent upper GI endoscopy. Then the effect of 6 months CPAP treatment on GERD in OSAS patients was assessed.

*Results:* The frequency of GERD in patients with OSAS was significantly higher than in controls (43.3% versus 13.3%,  $p = 0.044$ ). The heartburn and regurgitation in patients with OSAS were significantly higher than controls ( $p = 0.015$  and  $0.048$  respectively), while the difference in dysphagia was non significant ( $p = 0.526$ ).

The differences in heartburn and regurgitation in OSAS patients with GERD were significantly higher than OSAS patients without GERD ( $p = 0.002$  and  $0.001$  respectively), but the difference in dysphagia was non significant ( $p = 0.806$ ). After CPAP treatment for 6 months, GERD was cured in 8 patients out of 13 patients (61.4%).

*Conclusion:* GERD occurs more common in OSAS patients as compared to controls. There was positive impact that CPAP treatment reduces GERD in patients with OSAS by 61.5%.

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## Introduction

The occurrence of gastro esophageal reflux disease (GERD) after bed time is strongly associated with both asthma and obstructive sleep apnea syndrome (OSAS). It has been found that patients with OSAS exhibited more frequent nocturnal reflux symptoms than patients without OSAS [1]. It has been

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supposed that OSAS may predispose patients to the development of nocturnal GERD because apneic episodes are associated with increased arousal movement and increased transdiaphragmatic pressure as well as low intrathoracic pressure [2]. Foresman (2000) found that patients with OSAS experienced more than one hundred reflux episodes during the 8-h sleep period compared with twenty-three reflux episodes in the control subjects without OSAS [3]. Also, Ing et al. (2000) postulated that esophageal acid clearance was prolonged with significantly greater proportion of time at low esophageal pH in OSAS patients compared to non OSAS patients [4]. Kerr and colleagues (1992) reported that continuous positive airway pressure (CPAP) treatment reduced GERD in patients with OSAS [5].

### Aim of the work

The aim of this work was to determine the prevalence of GERD among OSAS patients and to assess its response to CPAP treatment.

### Patients and methods

This study was performed in on forty five subjects referred to the Chest Medicine Department of Menoufia University Hospitals, All subjects underwent initial polysomnography to determine the presence of obstructive sleep apnea hypopnea syndrome. Then all patients underwent upper GI endoscopy carried out in the Tropical Medicine Department of Menoufia University Hospitals. Then the response of 6 months CPAP treatment on GERD was assessed in OSAS patients.

Subjects were divided into:

Group 1 (patients): 30 patients with OSAS as evidenced by polysomnography (AHI > 5/h).

Group 2 (controls): 15 subjects without OSAS as evidenced by polysomnography (AHI < 5/h).

After having a written consent; each patient underwent:

- (1) Full history taking and clinical examination.
- (2) Chest X-ray.
- (3) Polysomnography: Polysomnography includes EEG, electrooculogram and sub mental electromyogram monitoring for sleep staging. Respirations were monitored using chest and abdominal Impedance plethysmography. Airflow was assessed with oronasalthermistor. Arterial oxygen saturation was monitored with continuous pulse oximetry, Heart rate and rhythm were recorded and monitored with continuous ECG. Periodic limb movements were monitored using bilateral tibial electromyography leads. Polysomnography used in this study is a full night polysomnography using Embla S4000 Medicare, Iceland. It was conducted in the sleep laboratory, Menoufia University Hospital.
- (4) Upper GI endoscopy.
- (5) CPAP for 6 months of first GI endoscopy to patients with GERD.

### Results

Table 1 shows that heartburn and regurgitation in patients with OSA were significantly higher than controls ( $p = 0.015$

and 0.048 respectively) while the difference in dysphagia was statistically non significant ( $p = 0.526$ ) (Fig. 1).

Table 2 shows that the frequency of GERD in patients with OSAS was significantly higher than in controls (43.3% versus 13.3%,  $p = 0.044$ ) (Fig. 2).

Table 3 shows that the differences in heartburn and regurgitation in OSAS patients with GERD were significantly higher than OSAS patients without GERD ( $p = 0.002$  and 0.001 respectively), but the difference in dysphagia was statistically non significant ( $p = 0.806$ ).

Table 4 shows that after CPAP treatment for 6 months, GERD was cured in 8 patients out of 13 patients (61.4%).

### Discussion

OSAS is a condition marked by pharyngeal narrowing, resulting in upper airway obstruction during sleep which in turn, produces repeated episodes of decreased oxygen saturation and brief arousals from sleep. Currently, sleep related GERD is underappreciated from a clinical standpoint. Gastro-esophageal reflux disease and obstructive sleep apnea syndrome are often co-morbid disorders [6,7].

The aim of this study was to determine the prevalence of gastroesophageal reflux in patients with obstructive sleep apnea and to assess its response to CPAP treatment. This prospective study comprised 30 patients with OSAS and 15 controls (without OSAS).

In the present study, the heartburn and regurgitation were significantly higher in patients with OSAS as compared to controls ( $p = 0.015$  and 0.048 respectively), Heart burn in patients with OSAS versus controls was 63,3% versus 20% and regurgitation in patients with OSAS versus controls was 40% versus 6.7% while dysphagia showed no significant difference ( $p = 0.526$ ). Dysphagia in patients with OSAS versus controls was 10% versus 0.0% (Table 1). This confirmed the common existence of classic symptoms of GERD (heartburn and regurgitation) in patients with OSAS in comparison to those without OSAS. This was in accordance to Teramoto et al. (1999) [8], Valipour et al. (2002) [9], Green et al. (2003) [10] and Guda et al. (2004) [11], who reported a significant increase in reflux symptoms in patients with demonstrated OSAS.

There were significantly higher frequency of GERD in patients with OSAS versus controls (43.3% versus 13.3%,  $p = 0.044$ ) (Table 2). These were in agreement with Penzel et al. (1999) [12] who found reflux in 53.3% (8 out of 15) of patients with OSAS. Berg et al. (1999) [13] reported reflux in 6 out of 14 (42.9%) patients with OSAS. Wise et al. (2006) [14] reported that 64.3% of patients with OSAS had GERD. Several other studies showed higher incidence of GERD in

**Table 1** Distribution of GERD symptoms between patients with OSAS and controls.

	Patients with OSAS (n = 30)		Controls (n = 15)		Z test	P value
	No.	%	No.	%		
Heart burn	19	63.3	3	20.0	2.42	0.015(S)
Regurgitation	12	40.0	1	6.7	1.97	0.048(S)
Dysphagia	3	10.0	0	0.0	0.63	0.526

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