

## Effects of opium inhalation on pulmonary volumes in smoking patients

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### ABSTRACT

Historically, opium was used as a potent analgesic and to treat dyspnea and cough. It is documented that opium can increase exercise tolerance and relieve breathlessness. However, its overdose can suppress respiratory centers. The purpose of this study was to evaluate effects of opium on spirometric lung volumes. The study was done on two groups of patients referred to the lung clinic of Labbafi Nejad hospital. Group A was composed of 84 patients who were smokers and group B was made up of 40 patients who were smokers and opium addicts. Patients underwent spirometry and demographic questionnaires were collected. Significant differences were noted on lung volumes between two groups. Forced Vital Capacity (FVC) was  $56 \pm 4.6$  % in Group A and  $72 \pm 4.7$  % in Group B ( $P < 0.001$ ). Difference on Forced Expiratory Volume in one second (FEV1) was also statistically significant,  $53 \pm 6.6$  % in Group A versus  $69 \pm 4.4$  % in Group B ( $P < 0.001$ ). In this study, lung volumes were considerably larger in patients who were opium addicts and smokers compared to patients who were only smokers. Further studies are warranted to confirm these results, and such confirmation may lead to better understanding about role of opioids in respiratory diseases.

**Keywords:** Dyspnea; Opium; Pulmonary; Spirometry.

### INTRODUCTION

Some of Iranian population use opium to treat their physical or psychotic disorders. In Iranian traditional medicine, opium has been chiefly used for treatment of moderate to severe pains. Other indications include treatment of diarrhea, coughing and insomnia [1,2]. The most important side effects of this agent are dependence and addiction, which can lead to cognitive disturbances. Opium overdose can cause severe respiratory suppression, coma and death [3]. Opium can be used orally or inhaled. Oral administration has slow onset, however, inhalation administration has rapid onset and shorter duration of action. There is an individual difference in amount of opium consumption, a study showed daily consumption from 0.75 gr to 30 gr [4]. Inhalation is the major route of administration of opium in Iran. The primary cause of chronic obstructive pulmonary disease (COPD) is cigarette smoking. As COPD progresses, dyspnea at rest develops and the

ability to perform activities of daily living declines [5,6]. Evidence from several studies has supported usefulness of opium for alleviation of dyspnea [7-9]. However, these studies have not evaluated effects of opium on lung volumes. Our goal was to assess effects of opium inhalation on lung volumes.

### PATIENTS AND METHODS

Patients admitted to the lung clinic of Labbafi Nejad hospital, Tehran, Iran (2012-2013) with use of at least 20 pack/year of cigarette were included in the study. Exclusion criteria were history of cardiac and pulmonary diseases, exposure to chemical gases and hospitalization during 4 weeks prior to the study. Individuals who used opium orally were also excluded. Our study subjects were divided into two groups, A: smokers and B: smokers-addicts. All patients filled the required questionnaire. Clinical examinations and spirometry were done. Spirometric parameters including Forced Vital Capacity (FVC), Forced

Expiratory Volume in one second (FEV1) and FEV1/FVC ratio were measured. The local ethical committee approved the study and informed consent letter was obtained from all participants.

#### Data analysis

Data are reported as mean  $\pm$  SD or numbers. Kolmogorov-Smirnov and Levens tests showed normal distribution of data. Mean were compared by *t*-test. Differences at the level of  $P < 0.05$  were considered statistically significant. All analyses were performed using SPSS 16.0.

## RESULTS

### Characteristics of patients

Table 1 shows clinicopathological features of subjects. One hundred and twenty four patients were included in the study. Eighty-four patients in Group A, had history of smoking at least 20 pack/year. In Group B, 40 patients had history of smoking at least 20 pack/year and also opium addiction for at least 10 years. All of the patients were male. Range of opium inhalation was from 3 to 40 gr/day. There was no significant difference in medications between two groups.

**Table 1.** Characteristics of Patients

Characteristics	Group A	Group B
Sex	Male	Male
Age (years)	60 $\pm$ 2.4	61 $\pm$ 3.8
Chief complaint	Dyspnea	Dyspnea
Smoking	yes	yes
Opium addiction	no	yes

**Table 2.** Spirometric findings in Groups A and B. (Data are shown as mean  $\pm$  SD)

Parameter	Group A	Group B	P value
FVC	56 $\pm$ 4.6	72 $\pm$ 4.7	0.001
FEV1	53 $\pm$ 6.6	69 $\pm$ 4.4	0.001
FEV1/FVC	68 $\pm$ 2.5	71 $\pm$ 3.7	0.07

### Spirometric findings

FVC, FEV1 and FEV1/FVC parameters were measured and compared within two groups (Table 2). Mean of FVC was 56  $\pm$  4.6 % in Group A and 72  $\pm$  4.7 % in Group B. This difference was statistically significant ( $P < 0.001$ ). Difference in FEV1 value was also significant, 53  $\pm$  6.6 % in Group A versus 69  $\pm$  4.4 % in Group B ( $P < 0.001$ ). Mean of FEV1/FVC ratio was 68.4  $\pm$  2.5 % for Group A and 71.7  $\pm$  3.7 % for group B ( $P > 0.05$ ).

## DISCUSSION

In the present study, we showed that patients using opium and cigarette had larger lung volumes compared to patients who only used cigarette. All individuals using opium are smokers, which is an important bias in investigations about opium and cigarette. Similar studies have not ruled out role of smoking, therefore they usually fail to gain a clear understanding about the effects of opium on lung volumes. Woodcock and colleagues showed that oral administration of 15mg hydrocodone could increase ability of 45 minutes walking up to 18% and relieved dyspnea up to 20% [10]. Light and colleagues discovered that 0.8 mg/kg morphine improved exercise tolerance up to 20% but caused a decrease in consciousness status [11]. Another study proved that inhalation of low dose morphine (less than 2mg/day) increased exercise time up to 35% in patients with COPD [12]. Interestingly, A study on 54 opium addicts reported bronchitis; bronchiolitis and pulmonary fibrosis after more than 2 years follow up. In this study, cigarette smoking has not been excluded as an important factor to cause respiratory diseases [13]. Another study in Iran demonstrated that rate of cardiorespiratory diseases was higher in persons who had addiction to any substance. Importantly, the investigators considered cigarette as the most common substance of addiction [14]. An Indian investigation showed that opium addicts had smaller lung volumes and higher levels of hepatic enzymes compared to normal controls. In this study, root of opium administration and duration of addiction were not clarified [15]. Moreover, a study in Iran reported an increased rate of airway hyperresponsiveness in patients who were both opium and cigarette addicts [16]. Taken together, it seems that the exact role of inhalational opium in respiratory disease is elusive. Opioids may exert their effects either by induction of anxiolysis or by direct effect of respiratory centers located in the CNS. It seems the latter is the main mechanism causes alleviation of respiratory symptoms [17]. Peptides that are similar to opioids have been found in bronchial mucosa and can be new targets for pharmacotherapy [18]. Obviously, the risk of causing dependence is an important consideration in the therapeutic use of these drugs.

In the present study, patients in Group B had chronic use of opioids by inhalation and showed higher lung volume compared to smokers.

## CONCLUSION

Opioids may be helpful in patients with dyspnea. The untoward effects of opioids outweigh their benefits on respiratory disorders.

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Further investigations are required to provide deeper insight about the therapeutic consideration of opioids in respiratory diseases.

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