

Anne Edvardsen¹, Aina Akerø², Jon A. Hardie³, Morten Ryg¹, Tomas M. L. Eagan³, Per S. Bakke³, Ole H. Skjøsberg²

¹ Dep. of Respiratory Physiology, Glittreklinikken, ² Dep. of Pulmonary Medicine, Oslo University Hospital, ³ Dep. of Thoracic Medicine, Haukeland University Hospital, Norway

Introduction

The reduced pressure in the aircraft cabin may cause significantly decreased arterial oxygen pressure and respiratory symptoms (dyspnea and air hunger) in patients with COPD [1-6].

Previous studies have focused on hypoxaemia during air travel whereas data on in-flight symptoms are limited. Two studies report symptoms in 18% of patients with respiratory disease during air travel [5,6].

However, it is not known whether the occurrence of in-flight symptoms can be predicted on the basis of pre-flight examination of the patient.

Aim

To evaluate if in-flight respiratory symptoms in patients with COPD are associated with pre-flight characteristics.

Methods

-A cross-sectional study of 575 COPD patients and healthy subjects. Participants were recruited from Bergen COPD Cohort Study.

-The study subjects completed a questionnaire on air travel habits and possible symptoms during air travel in the previous two years. Lung function measurements, blood gas analysis, and a six-minute walk test were performed. Score on the MRC Dyspnea scale was registered.

-211 patients with COPD and 159 subjects without COPD had traveled by air

-Respiratory symptoms during previous air travel were compared to pre-flight characteristics, using a logistic regression model. The model included age, gender, MRC Dyspnea score, exercise desaturation, and DL,CO.

-None of the COPD patients had performed a pre-flight Hypoxia-altitude simulation test.



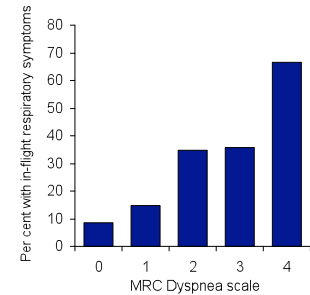
Results

Subject characteristics

	COPD patients n=211	Subjects without COPD n=159	P
Sex, M/F	124 /87	80/79	0.106
Age, yrs	61.9 (6.7)	53.6 (8.6)	<0.001
BMI, kg/m ²	25.2 (4.4)	25.8 (3.6)	0.112
Lung function			
FEV ₁ % predicted, %	51.6 (12.6)	103.0 (9.2)	<0.001
DL,CO, % predicted, %	61.4 (17.9)	84.3 (11.0)	<0.001
RV/TLC, %	43.1 (9.2)	27.6 (6.8)	<0.001
Blood gases and pulse oximetry			
Pa,O ₂ , kPa	9.5 (1.0)	10.8 (1.2)	<0.001
Pa,CO ₂ , kPa	5.3 (0.5)	5.2 (0.4)	<0.01
Sp,O ₂ , %	95.5 (2.3)	97.5 (1.2)	<0.001
Six-minute walk test			
Distance, m	459 (99)	-	-
End Sp,O ₂ , %	92.0 (4.7)	-	-
MRC Dyspnea scale	n=194	n=157	<0.001
Stage 0 and 1	122 (63)	156 (99)	
Stage 2 to 4	72 (37)	1 (1)	

Data are presented as n (%) or mean (SD).
MRC: modified Medical Research Council Dyspnea scale. - = not performed

COPD patients: In-flight respiratory symptoms and MRC Dyspnea score



-In a univariate analysis, occurrence of in-flight dyspnea or air hunger were significantly related to MRC Dyspnea score and exercise Sp,O₂ (p=0.001 and p=0.039).

-The adjusted OR for reporting dyspnea or air hunger was 4.8 (95%CI: 1.2-19.3) for those with MRC dyspnea grade 2 vs those with grade 0, and 0.93 (95%CI 0.87-0.99) per year increase in age. No other statistically significant associations were found.

In-flight symptoms

21% of the COPD patients had experienced respiratory symptoms while flying vs 4 % for the non-COPD subjects.

	COPD n=211	Subjects without COPD n=159
Dyspnea	31 (14.7%)	2 (1.3%)
Air hunger	24 (11.4%)	4 (2.5%)
Cough	10 (4.7%)	3 (1.9%)
Headache	10 (4.7%)	6 (3.8%)
Dizziness	8 (3.8%)	1 (0.6%)
Palpitations	5 (2.4%)	2 (1.3%)
Chest pain	3 (1.4%)	0
Fainting	1 (0.5%)	1 (0.6%)

Data are presented as n (%).

Risk of in-flight symptoms, COPD vs non-COPD subjects

	Unadjusted OR OR (95% CI)	Adjusted OR OR (95% CI)
Any one or more hypoxia related symptoms*	3.4 (1,8-6,4)	3.3 (1,6-6,7)
Dyspnea or air hunger	6.7 (2,8-16,2)	6.6 (2,5-17,3)
Other symptoms	0.7 (0,3-1,6)	0.6 (0,2-1,7)

Definition of abbreviations: OR = odds ratio; CI = confidence interval
Adjusted OR: Adjusted for smoking status, age and gender
* Dyspnea, dizziness, headache, chest pain, air hunger, cough, fainting, and palpitations were classified as hypoxia related symptoms. Other symptoms (ear pressure, sinus pressure and swollen legs) were classified as not hypoxia related symptoms.

Conclusion

-In-flight respiratory symptoms are common among COPD patients. The symptoms were strongly associated with MRC Dyspnea score. An association with exercise desaturation at sea level was also observed.

-A symptom-based approach may be useful in pre-flight assessment

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