News Release

FOR RELEASE May 16, 2010, 8:15 a.m. CDT

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Press conference time: May 16, 11:15 p.m. in the ATS Press Room (E-1)

Poster session time: 8:15-10:45 a.m. May 16
Location: CC-Room 293-294 (Second Level), Morial Convention Center

Pulmonary Rehabilitation Effective for Both Obese and Slim COPD patients

ATS 2010, NEW ORLEANS— Obese patients with chronic obstructive pulmonary disease (COPD) stand to gain as much from pulmonary rehabilitation as their slimmer counterparts, even though as a group they have a lower exercise capacity, according to new research from the University Hospitals of Leicester in the UK.

"Like the healthy population, the prevalence of obesity is increasing in those with COPD," said Neil Greening, M.B.B.S, M.R.C.P., who led the study. "There is evidence that obesity may lower exercise capacity but at the same time appears to confer a survival advantage, which is known as the obesity paradox. Pulmonary rehabilitation is effective in improving exercise capacity and health status in COPD but it is unclear whether these benefits accrue in patients with extreme obesity. We wanted to compare the outcomes of a pulmonary rehabilitation program in patients with obesity of varying severity and normal weight subjects."

The results of their study will be reported at the ATS 2010 International Conference in New Orleans.

To compare the effects of pulmonary rehabilitation between obese and non-obese patients, Dr. Greening and colleagues recruited patients with clinical and spirometric COPD and classified them according to their level of obesity, from normal weight (BMI 21-25kg/m^2) to extreme obesity (BMI >40 kg/m^2). The patients underwent pulmonary rehabilitation at a single center in the UK. The improvements in their exercise performance and endurance, as well as their health status (chronic respiratory questionnaire) and baseline characteristics were assessed.

"We found that obese people with COPD are more disabled in terms of exercise capacity, despite having less severe airflow obstruction (the measure used to quantify severity of COPD). However, they do just as well with rehab including those with extreme obesity," said Dr. Greening. "There is no difference between obesity subgroups in the proportion of patients achieving a clinically significant improvement in the incremental shuttle walk test."

This is the first study to look at PR in extreme obesity. While the researchers expected to find that some improvement would be seen after the pulmonary rehabilitation program, they were surprised to see no difference in training effects between normal weight and extremely obese patients.

"Patients with COPD, irrespective of body mass, improve following a pulmonary rehabilitation program. Therefore extremely obese patients with COPD should still be considered for enrolment," said Dr. Greening, adding that although there are no weight limits for pulmonary rehabilitation programs, there is likely some discrimination by medical staff who may emphasize weight loss over exercise.

There remain questions about the disparity in obese patients with COPD. Obese patients do not have the same improvements in health status following pulmonary rehabilitation. In particular, fatigue does not improve, possibly due to co-existing medical problems, such as obstructive sleep apnea or obesity hypoventilation, according to Dr, Greening. However, the most puzzling question remains the survival benefit conferred by obesity. "As medical professionals, we know that obesity is linked with medical complications such as diabetes and heart disease, so how it can lead to a survival advantage in other diseases such as COPD or chronic kidney disease is puzzling. The reasons for this are currently unknown and further research is needed."

A larger study is planned to examine some of these issues. "We are planning a study to look at the underlying mechanisms of skeletal muscle dysfunction and obesity in COPD," said Dr. Greening. "Rather than a larger multi-centre study looking at epidemiology, we are trying to understand why obesity affects patients with COPD in the way it does."

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"The Effects of Pulmonary Rehabilitation on Extreme Obesity in COPD" (Session A27, Sunday, May 16, 8:15-10:45 a.m., CC-Room 293-294 (Second Level), Morial Convention Center; Abstract 1342)

**Please note that numbers in this release may differ slightly from those in the abstract. Many of these investigations are ongoing; the release represents the most up-to-date data available at press time.*

The Effects of Pulmonary Rehabilitation on Extreme Obesity in COPD

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RATIONALE

Like the healthy population, the prevalence of obesity is increasing in those with COPD. There is evidence that obesity may increase exercise intolerance but appears to confer a survival advantage (the obesity paradox). However, little is known in the COPD population about patients with extreme obesity.

Pulmonary rehabilitation (PR) is effective in improving exercise capacity and health status in COPD but it is unclear whether these benefits accrue in COPD patients with extreme obesity. The objective of this study was to compare the outcomes of a pulmonary rehabilitation programme in obesity of varying severity compared with normal weight subjects.

METHODS

Patients with a clinical and spirometric (GOLD stage ≥2) diagnosis of COPD were identified from the PR database in Leicester, UK. Body mass index (BMI) was recorded at baseline. Patients were categorised using the WHO-defined categories; obese class 3 (extreme obesity BMI ≥40 Kg/m^2), obese class 2 (BMI ≥35-<40 Kg/m^2), obese class 1 (BMI ≥30-<35 Kg/m^2), overweight (BMI ≥25-<30 Kg/m^2) and normal weight (BMI ≥21-<25 Kg/m^2). These patients undertook an outpatient PR programme between 1994 and January 2009 at a single centre. Changes in exercise performance (incremental (ISWT) and endurance (ESWT) shuttle walk tests), health status (chronic respiratory questionnaire (CRQ)), baseline characteristics and completion rate were retrospectively compared.

RESULTS

779 patients were identified, of which 504 completed the PR programme (Mean age 69.7, FEV_1 percent predicted 40.9%, Male 59.9%). There was no difference in baseline CRQ scores in any domain. Baseline characteristics are shown in table 1.

Table 1: Baseline characteristics

	BMI Group (BMI)					ANOVA
	Normal(21-<25)	Overweight(25-<30)	Obese 1 (30-<35)	Obese 2 (35-<40)	Obese 3 (≥40)	p value
Number	185	166	106	32	15	
Age	69.5 ±8.5	70.0 ±9.0	70.4 ±8.4	69.3 ±6.2	65.0	0.215

					±7.9	
FEV1 % Predicted	36.9 ±14.7	42.0 ±15.6	42.8 ±14.7	47.5 ±18.2	48.4 ±13.4	<0.001
Gender (% Male)	63.0%	62.4%	58.6%	44.9%	38.5%	0.022
Pack years	37.8 ±21.2	39.4 ±24.5	46.1 ±28.4	38.0 ±22.8	46.6 ±34.8	0.122
Baseline ISWT	233.3 ±128.4	214.8 ±136.2	195.7 ±141.9	150.9 ±109.1	122.0 ±63.7	<0.001
Baseline ESWT	218.2 ±141.7	190.5 ±130.4	203.4 ±187.9	157.4 ±82.6	141.8 ±67.8	0.133
MRC	3.40 ±1.0	3.47 ±1.07	3.46 ±1.14	3.71 ±0.90	3.67 ±0.89	0.622
Saturations	93.5 ±7.4	94.3 ±2.4	93.1 ±9.6	90.4 ±16.5	90.9 ±7.1	0.074

Patients in all groups improved in both exercise performance ($p<0.01$) and health status ($p<0.01$), except the fatigue domain in the extreme obesity group (mean change 0.292, $p=0.199$). The changes in performance were similar in all BMI groups for both exercise performance and health status. Percentage of patients achieving the minimally important change in ISWT (48m) was similar in all groups (53.3%-58.5% $p=0.975$). Co-variates used for adjustment of p value were gender, FEV_1 percent predicted and baseline outcome measure.

Table 2: Changes in Exercise Performance

	BMI Group					p Value	
	Normal (21-<25)	Overweight(25-<30)	Obese 1 (30-<35)	Obese 2 (35-<40)	Obese 3 (≥40)	anova	ancova
ΔISWT (m)	58.7 ±73.4	58.9 ±63.8	64.7 ±71.9	74.7 ±72.7	48.7 ±48.7	0.667	0.728
ΔESWT (sec)	449.8 ±371.5	408.5 ±365.8	387.9 ±381.9	399.3 ±358.0	337.9 ±320.1	0.680	0.448

CONCLUSIONS

Patients with COPD and more extreme obesity have a worse exercise intolerance at baseline, despite less airflow obstruction. Patients of all levels of obesity improved in exercise performance after pulmonary rehabilitation There was no difference between obesity subgroups in the proportion of patients achieving a clinically significant improvement in ISWT.