**Online data supplement**

Computed tomography (CT)-assessed bronchodilation induced by inhaled indacaterol and glycopyrronium/indacaterol in COPD

Kaoruko Shimizu1\*, Ruriko Seto2\*, Hironi Makita1, Masaru Suzuki1, Satoshi Konno1, Yoichi M. Ito3, Rie Kanda2, Emiko Ogawa2,4, Yasutaka Nakano2, Masaharu Nishimura1\*\*

1 First Department of Medicine, Hokkaido University School of Medicine

2 Division of Respiratory Medicine, Department of Medicine, Shiga University of Medical Science

3 Department of Biostatistics, Hokkaido University School of Medicine

4 Health Administration Center, Shiga University of Medical Science

\* These two authors contributed equally to the entire study and writing of the manuscript.

\*\*Correspondence to: Masaharu Nishimura, M.D.

First Department of Medicine, Hokkaido University School of Medicine

N-15 W-7, Kita-Ku, Sapporo 060-8638, Japan

Fax: +81-11-706-7899; Tel: +81-11-706-5911

E-mail: ma-nishi@med.hokudai.ac.jp

Results

There are the results of pulmonary function tests at baseline (Visit 2) and at 4 to 5 weeks after inhalation of indacaterol (Visit 3) or glycopyrronium/indacaterol (Visit 5) in Table 2. Vital capacity (VC), VC, %predicted, inspiratory capacity (IC), FVC, FVC, %predicted, FEV1, FEV1, %predicted and FRC, %predicted increased significantly with indacaterol. Inhalation of glycopyrronium/indacaterol caused further increases in VC, VC, %predicted, FEV1, and FEV1, % predicted and a decrease in RV/TLC (Table 2). FEV1, %predicted, FRC, %predicted and RV, %predicted were significantly lower in the subjects who were good responders, who exhibited an increase in FEV1 of >12% and 200 ml with indacaterol. (Table E1) There were no significant differences in any parameters of pulmonary function tests at visit 3 between good responders and poor responders, who exhibited an increase in FEV1 of <12% or less than 200 ml with additional glycopyrronium. (Table E2) Good responders with combination therapy were older than the poor responders but no significant differences were found in any parameters of pulmonary function tests at the baseline (Visit 2). (Table E3)

Table E1. Characteristics of responders and non-responders in indacaterol

N　　　　　　　　 N=5 N=19

 Mean±SD Mean±SD p

Age yr 66.8±3.6 73.3±7.0 N.S.

Height cm 171.4±3.0 164.8±8.9 N.S.

Weight kg 61.5±3.9 58.3±10.4 N.S.

Smoking pack-years 51.5±5.5 68.8±22.1 N.S.

FVC %predicted 89.3±23.4 99.8±12.2 N.S.

FEV1 / FVC % 35.3±7.2 45.2±13.6 N.S.

FEV1 %predicted 35.7±11.0 53.8±15.5 0.02

TLC %predicted 117.9±11.3 108.8±11.2 N.S.

FRC %predicted 139.4±11.2 115.5±16.7 <0.01

RV %predicted 165.3±11,7 125.3±22.9 0.02

RV / TLC % 50.7±6.4 43.9±7.2　　　　 N.S.

DLco %predicted 64.3±29.8 79.3±23.6 N.S.

%LAV % 28.5±10.6 19.2±13.3 N.S.

Abbreviations: FEV1 = fo rced expiratory volume in 1 second, FVC = forced vital capacity, TLC = total lung capacity, FRC = functional residual capacity, RV = residual volume, DLco = carbon monoxide diffusing capacity, %LAV=%lung attenuation volume: (lung attenuation volume\*100) / lung volume

There are results of pulmonary function tests at baseline (Visit 2).

Table E2. Characteristics of responders and non-responders in glycopyrronium

N　　　　　　　　 N=4 N=20

 Mean±SD Mean±SD p

Age yr 72.5±7.9 71.9±6.9 N.S.

Height cm 167.1±5.9 165.9±8.9 N.S.

Weight kg 60.2±2.5 58.9±10.3 N.S.

Smoking pack-years 57.6±16.6 65.7±21.6 N.S.

FVC %predicted 104.5±17.2 100.7±18.1 N.S.

FEV1 / FVC % 43.2±16.5 44.6±11.0 N.S.

FEV1 %predicted 54.4±18.0 52.5±13.3 N.S.

TLC %predicted 119.7±12.5 109.1±12.0 N.S.

FRC %predicted 125.1±22.0 114.3±18.7 N.S.

RV %predicted 136.8±9.2 127.1±25.0 N.S.

RV / TLC % 43.1±3.2 44.0±8.0 N.S.

DLco %predicted 69.6±30.9 75.4±25.5 N.S.

%LAV % 20.7±14.5 20.6±13.0 N.S.

Abbreviations: FEV1 = forced expiratory volume in 1 second, FVC = forced vital capacity, TLC = total lung capacity, FRC = functional residual capacity, RV = residual volume, DLco = carbon monoxide diffusing capacity, %LAV=%lung attenuation volume: (lung attenuation volume\*100) / lung volume

There are the results of pulmonary function tests at Visit 3, before the patients with indacaterol started the inhalation of glycopyrronium.

Table E3. Characteristics of responders and non-responders in glycopyrronium/indacaterol

N　　　　　　　　 N=13 N=12

 Mean±SD Mean±SD p

Age yr 73.3±8.1 70.6±5.4 0.01

Height cm 169.0±6.2 163.0±9.7 N.S.

Weight kg 60.2±6.7 57.6±12.0 N.S.

Smoking pack-years 61.3±20.4 67.8±21.6 N.S.

FVC %predicted 99.4±14.3 95.9±16.4 N.S.

FEV1 / FVC % 39.6±10.4 47.0±14.9 N.S.

FEV1 %predicted 47.3±13.5 53.3±18.8 N.S.

TLC %predicted 114.7±11.7 106.2±10.1 N.S.

FRC %predicted 124.8±15.9 115.3±20.3 N.S.

RV %predicted 138.1±21.6 128.1±31.3 N.S.

RV / TLC % 45.4±5.7 45.1±9.2 N.S.

DLco %predicted 73.3±23.1 79.5±27.5 N.S.

%LAV % 24.5±11.7 17.3±14.1 N.S.

Abbreviations: FEV1 = forced expiratory volume in 1 second, FVC = forced vital capacity, TLC = total lung capacity, FRC = functional residual capacity, RV = residual volume, DLco = carbon monoxide diffusing capacity, %LAV=%lung attenuation volume: (lung attenuation volume\*100) / lung volume

There are results of pulmonary function tests at baseline (Visit 2).